LIVERMORE LAB
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Aug. 28-Sept. 2, 2011.

SNIFFING OUT THE BAD GUYS

Tom Slezak gestures in front of the mobile lab at the Laboratory. AP Photo/Ben Margot.

Just hours after the first death in the 2001 anthrax attacks, Tom Slezak was told to gather his team, collect his gear and get on a plane.

The longtime Laboratory biodefense researcher landed at Andrews Air Force Base outside the nation's capital and immediately realized he was on the front lines of a new type of war.

"We were met by a colonel in the Army," Slezak recalled. "He said, ‘Our nation is at war. And you've been drafted.' "

For decades, federal research labs like Lawrence Livermore had served as the government's Cold War research and development division. After Sept. 11, those same labs transformed themselves to invent new lines of defense against new terror threats, developing a nationwide system to sniff the air for germs such as anthrax and smallpox.

To read more, go to the Web.

The New York Times

DON'T FORGET THE SUN BLOCK

Mooted geo-engineering fixes for climate change include placing mirrors in space that reflect sunlight from the Earth. Photo courtesy of Blue Line Pictures/Getty Images

In an effort to reduce carbon emissions, some scientists are calling for a last-ditch option: geoengineering, in which the Earth's climate is directly manipulated.

There are several methods that could be used to cool the planet, though most have potentially large unintended consequences. One technique includes shooting aerosols into the atmosphere to block sunlight from reaching Earth, similar to how the ash from a volcanic eruption blocks some of the sun's rays.

The Government Accountability Office released a report that found that no geoengineering scheme could be deployed today, given the uncertainties. But a large majority of experts were in favor of research to narrow those uncertainties.

One of those experts is the Lab's Jane Long. "This is welcome news because it indicates people are taking the issues seriously and believe research is needed," said Long, who is heading the Bipartisan Policy Center task force. "Equally important, the GAO report recognizes that a research program should not at all detract from on-going climate mitigation and adaptation efforts."

To read more, go to the Web.

Innovation

YOU SAY YOU WANT A REVOLUTION

An artist's rendering of the dielectric wall accelerator that is planned to be used for proton therapy (the man is shown for scale).

A particle accelerator originally developed at the Laboratory for nuclear weapons could begin to appear in hospitals by 2014 to deliver lifesaving proton therapy for cancer patients.

As opposed to traditional radiation treatment in which some of the healthy tissue around a tumor is damaged, protons have minimal lateral side scatter in tissue. The beam stays focused on the tumor and delivers only low-dose side effects to surrounding tissue, making for more effective cancer treatment.

Proton therapy is considered especially effective for the treatment of eye cancer and for children who require radiation. It is also gaining ground as a method for treating prostate cancer because damage does not occur in the surrounding nerves that are important for maintaining sexual function.

To read more, go to the Web.

EE Times SUPER POWER ACTIVATE

Dawn is one of the newest supercomputers at the Laboratory and the precursor for Sequoia.

IBM has become the first company to ship a commercial microprocessor using transactional memory, a new feature for multicore chips that researchers have studied for years.

The BlueGene/Q processor used in the Sequoia supercomputer that IBM is building for the Laboratory will employ the new feature. Sequoia is expected to deliver 20 petaflops when it is complete in 2012.

When finished, the supercomputer could become one of the most powerful systems in the world. An early version of the system is already ranked as one of the most energy efficient supercomputers.

To read more, go to the Web.

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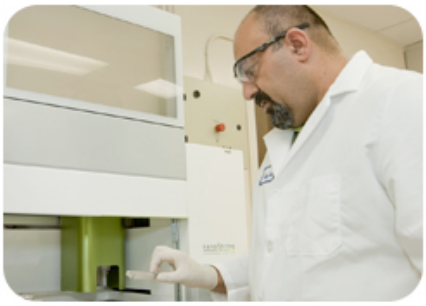
BUG FINDERS



Pejman Naraghi-Arani holds one of the assay chips that the Nanostring nCounter uses for detection and quantitation of RNA molecules.

Laboratory researcher Pejman Naraghi-Arani and his team know a thing or two about bugs. Specifically, the team has tools that can be applied to detect, mitigate the effects of and protect against a biological terrorism attack.

The team has been awarded $2.4 million by the National Institutes of Health under the Partnerships for Biodefense Program to develop this new technology.

Naraghi-Arani and partners, including the University of Texas Medical Branch, the University of California San Francisco and NanoString Technologies Corp., will use the funding to develop assays capable of detecting 35 category A, B and C viral pathogens, which include Ebola, Marburg, Dengue, Chikungunya and others.

Most diseases on this list present initial symptoms similar to a cold or flu -- headaches, nausea

and fever. Without the ability to detect the presence of specific viruses, there is no way to tell the difference between a normal infection and a deadly disease, reducing the treatment time window and the ability to mitigate the virus' spread. However, by developing an assay that leverages the NanoString's nCounter platform, these viruses can be quickly detected, in addition to specific cytokine and chemokine markers of infection.

To read more, go to the Web.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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